

What Is Claimed Is:

1. An SCR voltage transient protection device comprising a pair of complementary bipolar transistors each having a respective base, emitter and collector, said SCR fabricated such that a reach-through effect across the base of at least one of the complementary bipolar transistors causes triggering of the device.
2. The device as claimed in claim 1 comprising a lateral SCR.
3. The device as claimed in claim 1 comprising a layered SCR.
4. The device as claimed in claim 1 wherein the reach-through effect occurs across the base of the one of the pair of complementary bipolar transistors that is of a pnp type.
5. The device as claimed in claim 1 wherein the reach-through effect occurs across the base of the one of the pair of complementary bipolar transistors that is of a npn type.

6. The device as claimed in claim 1 fabricated using a CMOS compatible process.

7. A silicon controlled rectifier device comprising:

a first lightly doped region having a first conductivity type formed in a second lightly doped region having a second conductivity type;

a first heavily doped region having said first conductivity type formed in said second lightly doped region;

a second heavily doped region having said second conductivity type formed in said first lightly doped region;

said second heavily doped region, said first lightly doped region and said second lightly doped region forming an emitter, a base and a collector, respectively, of a first transistor;

said first heavily doped region, said second lightly doped region and said first lightly doped region forming an emitter, a base and a collector, respectively, of a second transistor;

an avalanche junction formed at the interface of the first and second lightly doped regions having an avalanche junction breakdown voltage; and

wherein one of the first and second transistors is characterized by attaining a reach-through voltage prior to the avalanche junction attaining the avalanche junction breakdown voltage.

8. A silicon controlled rectifier device as claimed in claim 7 comprising a lateral device.

9. A silicon controlled rectifier device as claimed in claim 7 comprising a layered device.

10. The device as claimed in claim 7 wherein the one of the first and second transistors that attains its reach-through voltage prior to the avalanche junction attaining the avalanche junction breakdown voltage comprises the first transistor.

11. The device as claimed in claim 10 wherein the first transistor comprises a pnp type transistor.

12. The device as claimed in claim 10 wherein the first transistor comprises a npn type transistor.

13. The device as claimed in claim 7 wherein the one of the first and second transistors that attains its reach-through voltage prior to the avalanche junction attaining the avalanche junction breakdown voltage comprises the second transistor.

14. The device as claimed in claim 13 wherein the second transistor comprises a pnp type transistor.

15. The device as claimed in claim 13 wherein the second transistor comprises a npn type transistor.

16. The device as claimed in claim 8 wherein the one of the first and second transistors that attains its reach-through voltage prior to the avalanche junction attaining the avalanche junction breakdown voltage comprises the first transistor.

17. The device as claimed in claim 16 wherein the first transistor comprises a pnp type transistor.

18. The device as claimed in claim 16 wherein the first transistor comprises a npn type transistor.

19. The device as claimed in claim 17 wherein the base of the first transistor is substantially within the range of 0.0005 mm to 0.05 mm.

20. The device as claimed in claim 18 wherein the base of the first transistor is substantially within the range of 0.0005 mm to 0.05 mm.

21. The device as claimed in claim 8 wherein the one of the first and second transistors that attains its reach-through voltage prior to the avalanche junction attaining the avalanche junction breakdown voltage comprises the second transistor.

22. The device as claimed in claim 21 wherein the second transistor comprises a pnp type transistor.

23. The device as claimed in claim 21 wherein the second transistor comprises a npn type transistor.

24. The device as claimed in claim 22 wherein the base of the second transistor is substantially within the range of 0.0005 mm to 0.05 mm.

25. The device as claimed in claim 23 wherein the base of the second transistor is substantially within the range of 0.0005 mm to 0.05 mm.

26. A silicon controlled rectifier device comprising:  
a lightly doped region of a first conductivity type;  
a lightly doped region of a second conductivity type adjacent said lightly doped region of said first conductivity type;  
a heavily doped region of said first conductivity type adjacent said lightly doped region of said second conductivity type wherein at least an intermediate portion of said lightly doped region of said second conductivity type is between said heavily doped region of said first conductivity type and said lightly doped region of said first conductivity type;  
a heavily doped region of said second conductivity type adjacent said lightly doped region of said first conductivity type wherein at least an intermediate portion of said lightly doped region of

said first conductivity type is between said heavily doped region of said second conductivity type and said lightly doped region of said second conductivity type;

an avalanche junction formed at the interface of the lightly doped regions; and

wherein a reach-through effect across at least one of said intermediate portions of said lightly doped regions occurs prior to an avalanche junction breakdown across the avalanche junction when voltage is impressed across the heavily doped regions.

27. A silicon controlled rectifier device as claimed in claim 26 wherein the device is a lateral device.

28. A silicon controlled rectifier device as claimed in claim 26 wherein the device is a layered device.

29. The device as claimed in claim 26 wherein the at least one of said intermediate portions of said lightly doped regions comprises an n-type material.

30. The device as claimed in claim 26 wherein the at least one of said intermediate portions of said lightly doped regions comprises an p-type material.

31. The device as claimed in claim 27 wherein said lightly doped region of said first conductivity type comprises a p-type material substrate, said lightly doped region of said second conductivity type comprises an n-type material well disposed in said p-type material substrate, said heavily doped region of said first conductivity type comprises a p-type material region disposed in said n-type material well, and said heavily doped region of said second conductivity type comprises an n-type material region disposed in said p-type material substrate.

32. The device as claimed in claim 27 wherein said lightly doped region of said first conductivity type comprises an n-type material substrate, said lightly doped region of said second conductivity type comprises a p-type material well disposed in said n-type material substrate, said heavily doped region of said first conductivity type comprises an n-type material region

disposed in said p-type material well, and said heavily doped region of said second conductivity type comprises a p-type material region disposed in said n-type material substrate.

33. The device as claimed in claim 31 wherein the reach-through effect across said at least one of said intermediate portions occurs across said lightly doped n-type material well.

34. The device as claimed in claim 33 wherein the reach-through effect occurs through a portion of said lightly doped n-type material well that is laterally oriented with respect to said p-type material region.

35. The device as claimed in claim 33 wherein the reach-through effect occurs through a portion of said lightly doped n-type material well that is vertically oriented with respect to said p-type material region.

36. The device as claimed in claim 31 wherein the reach-through effect across said at least one of said intermediate portions occurs across said lightly doped p-type material substrate.

37. The device as claimed in claim 32 wherein the reach-through effect across said at least one of said intermediate portions occurs across said lightly doped p-type material well.

38. The device as claimed in claim 36 wherein the reach-through effect occurs through a portion of said lightly doped p-type material well that is laterally oriented with respect to said n-type material region.

39. The device as claimed in claim 36 wherein the reach-through effect occurs through a portion of said lightly doped p-type material well that is vertically oriented with respect to said n-type material region.